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**SEARCH REQUEST FORM**

Examiner # (Mandatory): 79046 Requester's Full Name: Preeth Kumar

Art Unit 1751 Location (Bldg/Room#): CP3 9D03 Phone (circle 305) 306 308 0178

Serial Number: 09/926, 084 Results Format Preferred (circle): PAPER DISK E-MAIL

Title of Invention \_\_\_\_\_

Inventors (please provide full names): Please See Attached Bib-Sheet.

Earliest Priority Date: 02/26/1999

Keywords (include any known synonyms registry numbers, explanation of initialisms):

Claim!  
Text  
Please search claims 1-3.  
Focus: *Geotrichum candidum* Dec 1 FERM BP 7033  
& seq ID NO: 7 & Seq ID NO: 8.

Thank you,

Preeth (305-0178)

**Search Topic:**

Please write detailed statement of the search topic, and the concept of the invention. Describe as specifically as possible the subject matter to be searched. Define any terms that may have a special meaning. Give examples of relevant citations, authors, etc., if known. You may include a copy of the abstract and the broadcast or most relevant claim(s).

POINT OF CONTACT:  
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TECHNICAL INFO. SPECIALIST  
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Searcher: \_\_\_\_\_

Searcher Phone #: \_\_\_\_\_

Searcher Location: \_\_\_\_\_

Date Picked Up: 11/22

Date Completed: 12/6

Clerical Prep Time: 20

Terminal Time: \_\_\_\_\_

Number of Databases: 20

**Type of Search**

☒ N.A. Sequence  
☒ A.A. Sequence  
☐ Structure (#)  
☐ Bibliographic  
☐ Litigation1  
☐ Fulltext  
☐ Procurement  
☐ Other

**Vendors (include cost where applicable)**

☒ STN 34.41  
☐ Questel/Orbit  
☐ Lexis/Nexis  
☐ WWW/Internet  
☐ In-house sequence systems (list)  
☐ Dialog  
☐ Dr. Link  
☐ Westlaw  
☐ Other (specify)

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Text Search

Kumar 09/926,084

December 6, 2002

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L1 957 SEA FILE=HCAPLUS ABB=ON PLU=ON GEOTRICHUM CANDIDUM+NT/CT  
L3 33670 SEA FILE=HCAPLUS ABB=ON PLU=ON PEROXIDASE+OLD,NT/CT  
L5 4936 SEA FILE=HCAPLUS ABB=ON PLU=ON PEROXIDASE(3A) ENZYME  
L6 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L1 AND (L3 OR L5)  
L7 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L6 AND (DECOL? OR DYE)

=> d ibib ab hitind 1-5

L7 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2002 ACS  
ACCESSION NUMBER: 2000:615067 HCAPLUS  
DOCUMENT NUMBER: 133:295410  
TITLE: Effect of molasses on the production and activity of  
**dye-decolorizing** peroxidase from  
Geotrichum candidum decl  
AUTHOR(S): Lee, Tae Ho; Aoki, Hirokazu; Sugano, Yasushi; Shoda,  
Makoto  
CORPORATE SOURCE: Research Laboratory of Resources Utilization, Tokyo  
Institute of Technology, Yokohama, 226-8503, Japan  
SOURCE: Journal of Bioscience and Bioengineering (2000),  
89(6), 545-549  
CODEN: JBBIF6; ISSN: 1389-1723  
PUBLISHER: Society for Bioscience and Bioengineering, Japan  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB The prodn. of **dye-decolorizing** peroxidase (DyP) was  
investigated by cultivating Geotrichum candidum Decl using molasses as a  
carbon source. Molasses at concns. greater than 10 g.cntdot.l-1 was found  
to increase the **decolorization** activity of the culture broth  
toward **dye**, reactive blue 5 mainly because the amt. of enzyme  
produced was enhanced. However, complete inhibition of DyP activity by  
molasses was obsd. at the concn. of 20 g.cntdot.l-1, indicating that the  
inhibitory effect of molasses on the culture broth activity to  
**decolorize** the **dye** was involved. When the culture broth  
was dild. 25 times, the **dye-decolorizing** activity was  
7 times as much as that of non-dild. culture broth. The molasses  
fractions sepd. by gel chromatog. (300-400 mL and 400-500 mL fractions)  
completely inhibited the purified DyP. A scheme is proposed to control  
both pos. and neg. effects of molasses on the **dye**  
**decolorization** process.

CC 16-4 (Fermentation and Bioindustrial Chemistry)

Section cross-reference(s): 10, 41

ST Geotrichum peroxidase **dye decolorization** molasses

IT Fermentation

(batch; molasses effects on the prodn. and activity of **dye-**  
**decolorizing** peroxidase from Geotrichum candidum decl)

IT **Decolorization**

**Decolorizing agents**

**Geotrichum candidum**

**Molasses**

(molasses effects on the prodn. and activity of **dye-**  
**decolorizing** peroxidase from Geotrichum candidum decl)

IT 9003-99-0P, Peroxidase

RL: BMF (Bioindustrial manufacture); BPN (Biosynthetic preparation); BPR  
(Biological process); BSU (Biological study, unclassified); CAT (Catalyst)

use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); PROC (Process); USES (Uses)

(DyP; molasses effects on the prodn. and activity of **dye-decolorizing** peroxidase from *Geotrichum candidum* dec1)

IT 16823-51-1, Reactive blue 5

RL: BPR (Biological process); BSU (Biological study, unclassified); RCT (Reactant); BIOL (Biological study); PROC (Process); RACT (Reactant or reagent)

(molasses effects on the prodn. and activity of **dye-decolorizing** peroxidase from *Geotrichum candidum* dec1)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 2 OF 5 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2000:608892 HCAPLUS

DOCUMENT NUMBER: 133:189871

TITLE: Novel peroxidase from *Geotrichum candidum* Dec 1 useful for **decolorization** of **dyes**

INVENTOR(S): Syoda, Makoto; Sugano, Yasushi; Kubota, Hidetoshi

PATENT ASSIGNEE(S): Meiji Seika Kaisha Ltd., Japan

SOURCE: PCT Int. Appl., 43 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000050582	A1	20000831	WO 2000-JP1093	20000225
W:	AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
JP 2000245468	A2	20000912	JP 1999-50562	19990226
EP 1156106	A1	20011121	EP 2000-905340	20000225
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO			

PRIORITY APPLN. INFO.: JP 1999-50562 A 19990226  
WO 2000-JP1093 W 20000225

AB *Geotrichum candidum* peroxidase having the **dye** decompn. and **decolorization** activity, its recombinant expression, and uses in **dye** decompn. and **decolorization**, are disclosed. A peroxidase (DyP) involved in the **decolorization** of **dyes** and produced by fungal strain *G. candidum* Dec 1 was purified and characterized. DyP, a glycoprotein, was glycosylated with N-acetylglucosamine and mannose (17%) and had a mol. wt. of 60 kDa and a pI of 3.8. The absorption spectrum of DyP exhibited a Soret band at 406 nm corresponding to a hemoprotein, and its Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>-reduced form revealed a peak at 556 nm that indicated the presence of a protoheme as its prosthetic group. Nine of the 21 types of **dyes** that were **decolorized** by Dec 1 cells were **decolorized** by DyP; in

- particular, anthraquinone **dyes** Reactive Blue 5, Reactive Blue 19, AQ 2 were highly **decolorized**, as well as azo **dyes** Reactive Blue 182, Reactive Black 5, Reactive Red 33, and Reactive Yellow 2 to lesser extent. DyP also oxidized 2,6-dimethoxyphenol and guaiacol, but not veratryl alc. The optimal temp. for DyP activity was 30.degree., and DyP activity was stable even after incubation at 50.degree. for 11 h. The enzyme activity was inhibited by bivalent cations, Fe<sup>2+</sup> in particular.
- IC ICM C12N015-00  
ICS C12N009-04; C12N001-21; C09B067-00; C12N015-00; C12R001-645;  
C12N009-04; C12R001-19; C12N001-21; C12R001-19; C12N009-04;  
C12R001-645
- CC 7-2 (Enzymes)  
Section cross-reference(s): 3, 10, 41
- ST anthraquinone azo **dye** decompn **decolorization**  
Geotrichum peroxidase; Geotrichum peroxidase DyP gene sequence **dye**  
decompn **decolorization**
- IT Decomposition  
(biodegrdn.; novel peroxidase from Geotrichum candidum Dec 1 useful for  
**decolorization of dyes**)
- IT Cations  
(divalent, Dyp inhibition by; novel peroxidase from Geotrichum candidum  
Dec 1 useful for **decolorization of dyes**)
- IT Decomposition  
(enzymic; novel peroxidase from Geotrichum candidum Dec 1 useful for  
**decolorization of dyes**)
- IT Anthraquinone **dyes**  
Azo **dyes**  
Decolorization  
Dyes  
Enzyme kinetics  
Genetic vectors  
Geotrichum candidum  
Michaelis constant  
Molecular cloning  
Protein sequences  
cDNA sequences  
(novel peroxidase from Geotrichum candidum Dec 1 useful for  
**decolorization of dyes**)
- IT Escherichia coli  
(recombinant expression in; novel peroxidase from Geotrichum candidum  
Dec 1 useful for **decolorization of dyes**)
- IT 34940-32-4, AQ 2 (**dye**)  
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL  
(Biological study); PROC (Process)  
(AQ 2; novel peroxidase from Geotrichum candidum Dec 1 useful for  
**decolorization of dyes**)
- IT 15438-31-0, Fe<sup>2+</sup>, biological studies  
RL: BAC (Biological activity or effector, except adverse); BSU (Biological  
study, unclassified); BIOL (Biological study)  
(Dyp inhibition by; novel peroxidase from Geotrichum candidum Dec 1  
useful for **decolorization of dyes**)
- IT 12237-01-3  
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL  
(Biological study); PROC (Process)  
(Reactive Red 33; novel peroxidase from Geotrichum candidum Dec 1  
useful for **decolorization of dyes**)
- IT 288840-27-7 288840-28-8 288840-29-9 288840-30-2 288840-31-3

288840-32-4

RL: PRP (Properties)

(Unclaimed; novel peroxidase from Geotrichum candidum Dec 1 useful for **decolorization of dyes**)

IT 245078-90-4P

RL: BAC (Biological activity or effector, except adverse); BOC (Biological occurrence); BPN (Biosynthetic preparation); BSU (Biological study, unclassified); CAT (Catalyst use); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation); USES (Uses)

(amino acid sequence; novel peroxidase from Geotrichum candidum Dec 1 useful for **decolorization of dyes**)

IT 9003-99-0P, Peroxidase

RL: BAC (Biological activity or effector, except adverse); BOC (Biological occurrence); BPN (Biosynthetic preparation); BSU (Biological study, unclassified); CAT (Catalyst use); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation); USES (Uses)

(novel peroxidase from Geotrichum candidum Dec 1 useful for **decolorization of dyes**)

IT 90-05-1, Guaiacol 91-10-1, 2,6-Dimethoxyphenol 2580-78-1, Reactive blue 19 16823-51-1, Reactive blue 5 17095-24-8, Reactive black 5 50662-99-2, Reactive yellow 2 85496-36-2, Reactive blue 182

RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)

(novel peroxidase from Geotrichum candidum Dec 1 useful for **decolorization of dyes**)

IT 288880-04-6

RL: PRP (Properties)

(nucleotide sequence; novel peroxidase from Geotrichum candidum Dec 1 useful for **decolorization of dyes**)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 3 OF 5 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1999:171761 HCAPLUS

DOCUMENT NUMBER: 130:322224

TITLE: Purification and characterization of a novel peroxidase from Geotrichum candidum Dec 1 involved in **decolorization of dyes**

AUTHOR(S): Kim, Seong Jun; Shoda, Makoto

CORPORATE SOURCE: Research Laboratory of Resources Utilization, Tokyo Institute of Technology, Yokohama, 226-8503, Japan

SOURCE: Applied and Environmental Microbiology (1999), 65(3), 1029-1035

CODEN: AEMIDF; ISSN: 0099-2240

PUBLISHER: American Society for Microbiology

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A peroxidase (DyP) involved in the **decolorization of dyes** and produced by fungal strain G. candidum Dec 1 was purified and characterized. DyP, a glycoprotein, was glycosylated with N-acetylglucosamine and mannose (17%) and had a mol. wt. of 60 kDa and a pI of 3.8. The absorption spectrum of DyP exhibited a Soret band at 406 nm corresponding to a hemoprotein, and its Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>-reduced form revealed a peak at 556 nm that indicated the presence of a protoheme as its prosthetic group. Nine of the 21 types of **dyes** that were **decolorized** by Dec 1 cells were **decolorized** by DyP; in particular, anthraquinone **dyes** were highly **decolorized**

. DyP also oxidized 2,6-dimethoxyphenol and guaiacol, but not veratryl alc. The optimal temp. for DyP activity was 30.degree., and DyP activity was stable even after incubation at 50.degree. for 11 h.

CC 7-2 (Enzymes)  
Section cross-reference(s): 60

ST peroxidase *Geotrichum* **dye decolorization**

IT ***Geotrichum candidum***  
(Dec 1; purifn. and characterization of peroxidase from *Geotrichum candidum* Dec 1 involved in **decolorization of dyes**)

IT **Enzyme** kinetics  
Michaelis constant  
(of **peroxidase** from *Geotrichum candidum* Dec 1)

IT **Decolorization**  
**Dyes**  
(purifn. and characterization of peroxidase from *Geotrichum candidum* Dec 1 involved in **decolorization of dyes**)

IT **9003-99-0P, Peroxidase**  
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); NUU (Other use, unclassified); PRP (Properties); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(purifn. and characterization of peroxidase from *Geotrichum candidum* Dec 1 involved in **decolorization of dyes**)

REFERENCE COUNT: 52 THERE ARE 52 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2002 ACS  
ACCESSION NUMBER: 1998:772087 HCAPLUS  
DOCUMENT NUMBER: 130:92744  
TITLE: **Decolorization of molasses and a dye**  
by a newly isolated strain of the fungus *Geotrichum candidum* Dec 1

AUTHOR(S): Kim, Seong Jun; Shoda, Makoto  
CORPORATE SOURCE: Research Laboratory of Resources Utilization, Tokyo  
Institute of Technology, Nagatsuta, Midori-ku,  
Yokohama, 226-8503, Japan

SOURCE: Biotechnology and Bioengineering (1999), 62(1),  
114-119  
CODEN: BIBIAU; ISSN: 0006-3592

PUBLISHER: John Wiley & Sons, Inc.  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB A fungus, *Geotrichum candidum* Dec 1, newly isolated as a **dye-decolorizing** microorganism, was used to **decolorize** molasses and an anthraquinone **dye** in shaken flasks. A degree of **decolorization** of molasses of 87% was achieved after 12 days of cultivation, and the max. rate of **decolorization** of the **dye** in the culture broth was obtained in 7 days. The apparent activity of peroxidase in the molasses, which is responsible for **dye decolorization**, was significantly lower than that of purified peroxidase, due to the inhibition by molasses, but the inhibition was reduced after the fungus was fully grown. As two ultrafiltered fractions of molasses were similarly **decolorized** by Dec 1, Dec 1 apparently degraded colored substances of a wide range of mol. wts. When Dec 1 was cultivated in a medium in which sucrose in the molasses was hydrolyzed with invertase, the degree of **decolorization** of molasses, and rate of **decolorization** of the **dye** were

similar to those obtained above.

CC 10-6 (Microbial, Algal, and Fungal Biochemistry)

ST Geotrichum molasses anthraquinone **dye decolorization**

IT Anthraquinone **dyes**  
**Geotrichum candidum**  
Molasses  
(**decolorization** of molasses and **dye** by newly isolated strain of fungus Geotrichum candidum Dec 1)

IT 9003-99-0, Peroxidase  
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BIOL (Biological study)  
(**decolorization** of molasses and **dye** by newly isolated strain of fungus Geotrichum candidum Dec 1)

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 5 OF 5 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1995:676871 HCAPLUS

DOCUMENT NUMBER: 123:79248

TITLE: Characteristics of a newly isolated fungus, Geotrichum candidum Dec 1, which **decolorizes** various **dyes**

AUTHOR(S): Kim, Seong Jun; Ishikawa, Kenichi; Hirai, Mitsuyo; Shoda, Makoto

CORPORATE SOURCE: Res. Lab. Resour. Utilization, Tokyo Inst. Technol., Yokohama, 226, Japan

SOURCE: Journal of Fermentation and Bioengineering (1995), 79(6), 601-7  
CODEN: JFBIEX; ISSN: 0922-338X

PUBLISHER: Society for Fermentation and Bioengineering, Japan

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A fungus, Geotrichum candidum Dec 1, newly isolated from soil as a **dye-decolorizing** microorganism, **decolorized** 18 kinds of reactive, acidic and dispersive **dyes**, all the **dyes** used on the solid medium were also **decolorized** even in a liq. medium, although the **decolorizing** rates varied depending on the **dye** structure. By repeated addn. of one **dye**, Reactive blue 5, about 12 g/l of the **dye** was degraded without significant decline of activity, showing the resistant property of Dec 1 to a high concn. of the **dye**. An energy source and oxygen were essential for the expression of **decolorizing** activity; the optimal temp. was 30.degree.. A crude extracellular enzyme soln., in which the **decolorizing** activity was more than 100 times that of the Dec 1 culture broth, showed peroxidase activity, indicating that some peroxidases are responsible for **dye-decolorization**.

CC 10-2 (Microbial, Algal, and Fungal Biochemistry)

Section cross-reference(s): 16

ST Geotrichum **dye** degrdn extracellular peroxidase; **decolorization** Geotrichum extracellular enzyme

IT **Decolorization**

**Dyes**  
Fermentation  
**Geotrichum candidum**  
(characteristics of a newly isolated fungus, Geotrichum candidum Dec 1, which **decolorizes** various **dyes**)

IT 9003-99-0P, Peroxidase

RL: BAC (Biological activity or effector, except adverse); BPN  
(Biosynthetic preparation); BSU (Biological study, unclassified); BIOL  
(Biological study); PREP (Preparation)  
(extracellular; characteristics of a newly isolated fungus, Geotrichum  
candidum Dec 1, which **decolorizes** various **dyes**)